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May 23, 2002

VIA FEDERAL EXPRESS

Mr. Richard R. Long, Director
Air and Radiation Program
EPA Region 8
Mailcode 8P-AR
999 18th Street
Suite 300
Denver, CO 80202

Re: Supplemental Response of Great River Energy to Request for Comments on EPA's Draft SO_2 Modeling for North Dakota

Dear Mr. Long:

As indicated in my April 26, 2002 letter to you, this letter and attached documents includes Great River Energy's Post-Hearing Comments and Appendix of Exhibits submitted to the North Dakota Department of Health today as part of the record in the state's SO_2 SIP adequacy determination proceedings of which EPA also has been a participant. As I indicated in my April 26 letter, these comments and attached technical reports, including an evaluation by Earth Tech, the developers of the Calpuff model, address and provide recommendations regarding EPA's draft dispersion modeling analysis of PSD increment consumption in North Dakota and eastern Montana. We believe that the comments and technical reports will be helpful to EPA in evaluating the North Dakota increment issue.

Please call me if you have any questions.

Sincerely,

James A. Mennell

c. Mary Jo Roth

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May 23, 2002

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Mr. Douglas A. Bahr
Hearing Officer—PSD Increment Proceeding
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Re: PSD Increment Proceeding
Great River Energy's Post-Hearing Comments And Documents For Inclusion In the Record

Dear Sirs:

Enclosed are two copies of Great River Energy's Post-Hearing Comments regarding the above-referenced proceeding. These comments respond to issues raised during public hearings on May 6-8, 2002, and include citations and references to applicable authority referenced during GRE's oral testimony. The Appendix of Exhibits to Great River Energy's Post-Hearing comments includes technical reports from Earth Tech regarding monitoring and modeling issues and other documents relevant to this proceeding. GRE hereby requests that its Post Hearing Comments and all documents included in the Appendix of Exhibits are included in the record for this proceeding.

Please call me if you have any questions.

Sincerely,

James A. Mennell

c. Mary Jo Roth

Before The North Dakota Department of Health

Hearing Regarding Proposed Determination of the Adequacy of the North Dakota State Implementation Plan to Prevent Significant Deterioration

Post-Hearing Comments of Great River Energy

Before the North Dakota Department of Health
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Post-Hearing Comments of
Great River Energy

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Before the North Dakota Department of Health
Hearing Regarding Proposed Determination of the Adequacy of the North Dakota State Implementation Plan to Prevent Significant Deterioration

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I. Introduction and Summary

At issue in this proceeding is the simple question: whether ambient concentrations of sulfur dioxide ("SO_2") in North Dakota's Class I areas have increased since the "baseline" date in late 1977 above the specified levels or "increment" allowed under the Clean Air Act. To this simple question, the answer is no. There is no actual air quality data from ambient air monitors, emissions testing, or CEMs that support the argument that SO_2 concentrations have increased above allowable amounts since the baseline period. To the contrary, all evidence of actual air measurements in North Dakota's Class I areas indicate that SO_2 concentrations in those areas have decreased. The facts establish that North Dakota's air quality has improved in its Class I areas and that the State's Implementation Plan has adequately prevented significant deterioration.

Under the Clean Air Act, increment consumption determinations are to be based on "available air quality data." The only actual air quality data available regarding ambient concentrations of SO_2 in North Dakota's Class I areas are from SO_2 monitors located in those Class I areas. This air quality data includes thousands of actual measurements of the air in the Class I areas, over more than 20 years. The data conclusively demonstrates that ambient concentrations of SO_2 in North Dakota's Class I areas have not increased since the baseline period, much less consumed the additional increment available for growth under the Clean Air Act.

This finding is supported by the fact that more than 75% of the measurements for SO_2 at the North and South Units of Theodore Roosevelt National Park are below the minimum detectable levels. Put another way, most days, there is not any measurable concentration

of SO_2 in the park. The finding also is supported by the fact that numerous grandfathered baseline sources of SO_2 have ceased or curtailed operations, and there has been a significant reduction of SO_2 emissions from oil and gas sources located near North Dakota's Class I areas. It is also supported by the fact that a baseline source located to the west of the Class I areas in Montana, the Anaconda Copper Smelter, which was at one time reportedly the second largest source of SO_2 emissions in North America and emitted more SO_2 than all of the utilities in North Dakota combined, ceased operations in the early 1980s. It is also supported by the findings of the Federal Land Managers for the North Dakota Class I areas, who have certified that all major sources constructed in the state in the last twenty years do not cause significant deterioration to the Class I areas and that "air quality in North Dakota has actually improved." Such a finding is also supported by the recent draft modeling conducted by the North Dakota Department of Health ("NDDH") and by the refined modeling conducted by Basin Electric's consultant, ENSR Consulting, that reflect compliance with increment requirements. Accordingly, there is no factual basis to contend that ambient concentrations of SO_2 have increased in North Dakota's Class I areas or that North Dakota's SIP is "substantially" inadequate to insure compliance with Clean Air Act increment requirements.

EPA's preliminary and experimental computer modeling, which relies on variables stacked upon variables to guess ambient concentrations of SO_2, does not constitute valid, accurate or supportable evidence of historic or present SO_2 concentrations in North Dakota's Class I areas, and may not be used to contend a violation of the increment. EPA used a new model, Calpuff, which has not been formally approved as a guideline model, is not allowed under North Dakota law, was used to approximate concentrations at distances longer than recommended by EPA's own guidance, and was used with different settings than recommended by EPA's own guidance. In fact, had EPA used the default option settings recommended by the Interagency Workgroup and EPA's own proposed rule regarding Calpuff, the results would have been found to be invalid under EPA's own assessment of model validity which, incredibly, only considers a model invalid if it is wrong by more than a factor of two.

Not only is EPA using an unapproved and possibly inaccurate model, they are modeling without the appropriate meteorological data, and are modeling using incorrect baseline emissions estimates premised upon interpretations of the law that are counter to the Clean Air Act, and inconsistent with Congressional intent. EPA also is using a "paired-in-time" approach to assess increment consumption that the Calpuff model is incapable of performing accurately. Accordingly, there is no legal, factual, or plausible basis for NDDH to conclude anything other than that North Dakota's SIP is, and has been, adequate to prevent significant deterioration

II. Use Of Monitored SO_2 Concentrations To Assess Baseline Concentrations And Increment Consumption Is Appropriate Under Applicable Law And Guidance And Is The Best Available Air Quality Data And Evidence Of Those Concentrations And The Improvement Of Air Quality In North Dakota

Under the Clean Air Act, the term baseline concentration is defined to include:

> The ambient concentration levels which exist at the time of the first [PSD permit application] based on air quality data available in the Environmental Protection Agency or a state pollution control agency and on such monitoring, as the permit applicant is required to submit.

42 U.S.C. § 7479(4). The only actual "air quality data available" for North Dakota's Class I areas is from the ambient air monitors located in North Dakota's Class I areas, which have taken thousands of measurements over more than twenty years. See Assessment of Trends in Measured Ambient Sulfur Dioxide Concentrations Within Theodore Roosevelt National Park (hereinafter "SO_2 Monitoring Report") at 5-7, App. Ex. 1. Data has been collected from monitors in three separate locations inside Theodore Roosevelt National Park North and South Units. Id. at 3. This data is of high quality and from EPA-approved monitors that have experienced good data recovery. Id. at 2-7.

When Congress included the phrase "air quality data available" in the Clean Air Act, it intended that actual air quality data was to be used for establishing baseline and assessing increment. As noted in the Senate Report to the 1977 amendments to the Clean Air Act,

> [t]he purpose is to use actual air quality data to establish the baseline. Where sufficient actual data are not available, the state may require the applicant to perform whatever monitoring the state believes is necessary to provide that information.

S. Rep. No. 127, 95th Cong., 1st Sess. 98 (1977) (emphasis added). In the landmark case concerning the PSD program, Alabama Power, the court was clear that baseline concentration is to be determined using "actual air quality data" and expressly noted that "monitors" be used to establish baseline and assess increment. Alabama Power v. Costle, 636 F.2d 323, 374-76 (D.C. Cir. 1979).

A. EPA Guidance Also Supports Use Of Monitored Data For Assessing Increment Consumption

EPA also has long supported establishing baseline concentrations through monitoring. According to EPA, in its first proposed rulemaking regarding PSD, baseline concentrations may be "measured" using monitoring. See 38 Fed. Reg. 18986, 18995 (July 16, 1973). EPA reiterated this position in 1974 in approving PSD requirements into state implementation plans, stating that "baseline concentration" may be established using "monitoring" as the method of analysis. See 39 Fed. Reg. 3100, 31007 (Aug. 27, 1974). Later, in its 1980 final rules regarding the PSD program, EPA expressly noted "the statutory requirement to use monitoring data to establish baseline concentration." See 45 Fed. Reg. 52676, 52717 (Aug. 7, 1980). Further, in EPA's often-cited New Source Review Workshop Manual, the agency states:

> [t]he assessment of existing ambient concentrations may be done by evaluating monitoring data. It is generally preferable to use data collected within the area of concern; however, the possibility of using measured concentrations from representative "regional" sites may be discussed with the permitting agency.

USEPA Draft New Source Review Workshop Manual (October 1990) at C.18 (emphasis added).

EPA also has supported that assessment of increment consumption may be accomplished through monitoring. In proposing amendments to the PSD program in 1979, EPA stated:

> EPA agrees that monitored ambient data is valuable for such purposes as validating and refining models and, in some cases, providing a direct measure of increment consumption. In accordance with the court's opinion [in Alabama Power] EPA plans to place greater emphasis on the development and use of monitoring data.

44 Fed. Reg. 51924, 51944 (Sept. 5, 1979) (emphasis added). Even in its modeling guidance included in Appendix W of 40 C.F.R. Part 51, EPA reiterates this position where it states:

> There are instances where the performance of a recommended dispersion modeling technique by comparison with observed air quality data may be shown to be less than acceptable. Also, there may be no recommended modeling procedure suitable for the situation. In these instances, emission limitations may be established solely on the basis of observed air quality.

40 C.F.R. Part 51 Appendix W. at 11.1. Accordingly, Congress, the courts, and EPA have been clear that using monitoring data is appropriate in establishing baseline concentrations and in assessing increment consumption. This is particularly true given the unique nature of this proceeding.

B. Use Of Monitored Data Is Particularly Appropriate Given The Unique Nature Of This Proceeding

The purpose of this proceeding is merely to determine whether, in fact, ambient concentrations of SO_2 in the Class I areas have increased beyond those "increments" allowed under the Clean Air Act (i.e., has there been actual significant deterioration in air quality). This is not a prospective permitting proceeding. In the permitting context, it is necessary to use a model to predict emissions because emission sources have not been constructed. Modeling is the only way to assess, prospectively, whether a new source will have consequential impacts on air quality. In the context of the present hearing, however, the question is whether the North Dakota SIP has been adequate to prevent significant deterioration in North Dakota's Class I areas. There is no need to predict emissions from yet to be built sources; that has already been done during the permitting

of those sources which, in the case of North Dakota, were already certified to be in compliance with PSD requirements. See Final Certification of No Adverse Impact on Theodore Roosevelt National Park and the Wilderness Portion of Lostwood National Wildlife Refuge, 47 Fed. Reg. 41480-01 (Sept. 20 1982); Final Certification of No Adverse Impact on Theodore Roosevelt National Park, 49 Fed. Reg. 38197-02 (Sept. 27, 1984); Final Determination to Extend Certification of No Adverse Impact on Theodore Roosevelt National Park and Lostwood Wilderness Area, 50 Fed. Reg. 7658-04 (Feb. 25, 1985); Final Certification of No Adverse Impact on Theodore Roosevelt National Park and Lostwood Wilderness Area, 58 Fed. Reg. 13639-01 (Mar. 12 1993). All that is required in this proceeding is the factual determination of whether ambient concentrations of SO_2 have increased beyond allowable levels. The best evidence, and only "actual air quality data" to make such a determination, is that from the ambient air monitors located in the Class I areas.

III. Monitored Ambient Concentrations Of Sulfur Dioxide In North Dakota's Class I Areas Demonstrate That North Dakota's SIP Is Not Substantially Inadequate And SO_2 Concentrations Are In Compliance With Increment Requirements.

Data from the ambient monitors located in North Dakota's Class I areas indicate that there has been no increase in ambient SO_2 concentrations in those areas. See SO_2 Monitoring Report at 7-8, App. Ex. 1. Figure 14 of the SO_2 Monitoring Report demonstrates that measured SO_2 concentrations in the Theodore Roosevelt National Park North Unit have decreased dramatically on a twenty-four hour basis, over the past twenty years. Figure 14 also demonstrates that there has been no increase in ambient concentrations in Theodore Roosevelt National Park South Unit on a twenty-four hour basis. Figure 15 of the SO_2 Monitoring Report demonstrates that measured SO_2 concentrations in the Theodore Roosevelt National Park North Unit have decreased dramatically on a three-hour basis, over the past twenty years. See App. Ex. 1. Figure 15 also demonstrates that there has been no increase in ambient concentrations in Theodore Roosevelt National Park South Unit on a three-hour basis. Right here is the answer to this proceeding. There is no evidence of significant deterioration in North Dakota's Class I areas.

EPA contends that despite this twenty year trend that monitoring data is insufficient to answer the question of whether North Dakota's SIP has been substantially inadequate to prevent significant deterioration because of the absence of monitoring data from 1976-77. Interestingly, EPA's only remedy for such an argument is, at best, ironic. In short, it goes something like this: "because there is no monitoring data for these two years, we should reject the twenty years of actual data, and instead employ projected emissions estimates, not based on any actual measurement of emissions from any of the relevant facilities during the baseline period, using a non-approved model that relies on metrological information collected more than a decade after the baseline date, and that are not linked in any way to the emissions on a particular day, to guess at what baseline concentrations "might" have been." It is not a very compelling argument as to why modeled emissions would present a more accurate assessment of SO_2 concentrations than actual measured data.

A. There Is No Air Quality Data Or Evidence To Support That Ambient Concentration Levels Of SO_2 In Class I Areas Were Substantially Lower In 1976-77 Than They Were In 1980-81

Monitored data from 1980 and 1981, just a few years after the SO_2 baseline date, still constitutes the best available evidence of baseline concentrations and North Dakota's SO_2 air quality trends. North Dakota law, NDAC 33-15-15--01.1.d(1)(a), includes in the baseline concentration "actual emissions representative of sources in existence on the applicable minor source baseline date." (emphasis added). There is absolutely no actual air quality data from ambient monitors, emissions tests, or CEM data to support that ambient SO_2 concentrations in 1980 and 1981 are significantly different from 1976 and 1977, or that 1980 and 1981 measured emissions are not representative of sources in existence during those years. EPA carries the burden of proving that this is the case in order to initiate a SIP call. As no actual air quality data exists to support such a position, EPA clearly cannot meet this burden.

More specifically, there is no evidence to support that the ambient concentrations in the North Unit, on a 24-hour basis, were more than approximately five times lower in 1976-77 than they were in 1980-81, which is what EPA would need to establish to show

increment consumption above the 5 microgram per cubic meter threshold when compared to the most recent full year of monitored data. See SO_2 Monitoring Report at 8, App. Ex. 1; See also Testimony of John Sandstedt, Transcript of Hearing, Proposed Determination of the Adequacy of the North Dakota State Implementation Plan to Prevent Significant Deterioration, May 6-8, 2002 (hereinafter "Transcript") at 548-552, App. Ex. 3. There is no evidence to support that this was the case. Similarly, there is no evidence to support that the ambient concentrations in the South Unit, on a 24-hour basis, were more than two times lower in 1976-77 than they were in 1980-81 to show increment consumption above the 5 microgram per cubic meter threshold, when compared to the most recent full year of monitored data. See SO_2 Monitoring Report at 8, App. Ex. 1; See also Testimony of John Sandstedt, Transcript at 548-552, App. Ex. 3. Again, there is no evidence to support such a finding.

With respect to the 3-hour standard, there is no evidence to support that the ambient concentrations in the North Unit were more than 80 times lower, and in the South Unit more than four times lower, in 1976-77 than in 1980-81, which is what EPA would need to establish to show increment consumption above the 25 microgram per cubic meter threshold when compared to the most recent full year of monitored data. See SO_2 Monitoring Report at 8, App. Ex. 1; See also Testimony of John Sandstedt, Transcript at 548-552, App. Ex. 3. Thus, evidence, common sense, and North Dakota law all support that twenty years of ambient data from the State's Class I areas demonstrate that ambient concentrations of sulfur dioxide have not increased since the baseline date above the specified "increment" allowed under the Clean Air Act.

B. Additional Evidence Supports The Finding, As Established By Monitoring Data, That Sulfur Dioxide Concentrations Have Not Increased Above Allowable Increment

Substantial evidence supports that SO_2 concentrations have not increased above allowable increment. This evidence includes testimony by the Department regarding baseline emission sources that have shut down and thereby expanded available increment. See Testimony of Terry O'Clair, Transcript at 15, App. Ex. 3. These sources included the Neal Station, Royal Oak Briquette, MDU Beulah, and Flying J Refinery facilities. Id.

The Department also testified that other baseline sources have reduced emissions since the baseline period further expanding available increment. Id. These include sources such as the Amerda Hess facility and the Lignite gas processing plant. Id. The Department also testified regarding the reduction of SO_2 emissions from baseline oil and gas wells located near North Dakota's Class I areas. Id. This testimony was further supported by Ron Day of the North Dakota Petroleum Council who testified that following the baseline period, the oil and gas industry "invested hundreds of millions of dollars in abatement and elimination of SO_2 emissions in western North Dakota." Testimony of Ron Day, Transcript at 596-597, App. Ex. 3.

Evidence supporting that SO_2 concentrations have not increased above allowable increment also includes the fact that the Anaconda Copper Smelter, which was at one time reportedly the second largest source of SO_2 emissions in North America and emitted more SO_2 than all of the utilities in North Dakota combined, ceased operations in the early 1980s. Included as App. Ex. 4 is a copy of a Montana Air Quality Data and Information Summary for 1979-1980 that indicates that emissions from the Anaconda Copper Smelter for just a six-month period in 1980 were 126,642 tons, or more than twice the current *annual* emissions from all of North Dakota's increment consuming utilities (non-baseline units) combined.

That SO_2 concentrations have decreased also is supported by the fact that more than 75% of the measurements for the Theodore Roosevelt National Park North Unit and more than 85% of the measurements for the South Unit are below the minimum detectable levels. SO_2 Monitoring Report at 7, App. Ex. 1. This is particularly striking when considering EPA's testimony about "significant background sources over the Canadian border that may influence [North Dakota's] monitored sites." Testimony of Richard Long, Transcript at 107, App. Ex. 3. Thus, even with SO_2 emissions from Canada, surrounding states, and baseline emissions sources, most days there is not any measurable concentration of SO_2 in Theodore Roosevelt National Park.

Finally, that SO_2 concentrations have not increased above allowable increment also is supported by the findings of the Federal Land Managers for the North Dakota Class I

areas, who have certified that all major sources constructed in the state in the last twenty years do not cause significant deterioration to the Class I areas and that "air quality in North Dakota has actually improved." See Final Certification of No Adverse Impact on Theodore Roosevelt National Park and the Wilderness Portion of Lostwood National Wildlife Refuge, 47 Fed. Reg. 41480-01 (Sept. 20 1982); Final Certification of No Adverse Impact on Theodore Roosevelt National Park, 49 Fed. Reg. 38197-02 (Sept. 27, 1984); Final Determination to Extend Certification of No Adverse Impact on Theodore Roosevelt National Park and Lostwood Wilderness Area, 50 Fed. Reg. 7658-04 (Feb. 25, 1985); Final Certification of No Adverse Impact on Theodore Roosevelt National Park and Lostwood Wilderness Area, 58 Fed. Reg. 13639-01 (Mar. 12 1993).

C. Draft Modeling Conducted By NDDH And ENSR Supports The Finding, As Established By Monitoring Data, That Sulfur Dioxide Concentrations Have Not Increased Above Allowable Increment

The recent draft modeling conducted by NDDH also supports the finding, as established by monitoring data, that sulfur dioxide concentrations have not increased above allowable increments. Testimony of Terry O'Clair, Transcript at 28-29, App. Ex. 3. This is particularly true when considering that NDDH's analysis is more conservative, or protective, than required by North Dakota law and does not employ appropriate refinements to the modeling that would allow for better model performance and indicate lower increment consumption. Refined modeling conducted by ENSR also supports the finding, as established by monitoring data, that sulfur dioxide concentrations have not increased above allowable increments. Testimony of Robert J. Paine, Transcript at 436-438, App. Ex 3. Even EPA's draft modeling, when considering the over-prediction bias established by the limited NDDH validation review, suggests compliance with increment requirements within the accuracy of the model. See Earth Tech, Evaluation of the CALPUFF Air Dispersion Model As Applied to Assess Class I SO_2 Increment Status in North Dakota (hereinafter "Earth Tech Modeling Report"), at 8, App. Ex. 2. While such draft modeling supports the finding of no significant deterioration, it is not the appropriate basis for any regulatory determination regarding the increment issue under consideration here.

IV. Draft Modeling Conducted To Date Is Not Valid Or Accurate Evidence Of SO_2 Concentrations In Class I Areas And May Not Be Used To Contend a Violation of the Increment.

With respect to attempts to address the increment question through modeling, in addition to being unnecessary given the unique nature of this proceeding, and the monitored data discussed above, there are at least five significant reasons why the draft and preliminary modeling efforts to date may not be used to contend that ambient SO_2 concentrations have increased above the allowable increment.

A. Use Of Calpuff, Which Is Not An Approved Guideline Model, Is Not Allowed Under North Dakota Law

Draft modeling conducted by EPA and NDDH is not valid or accurate air quality data and may not be used to contend violation of the increment. Because of concerns about model inaccuracy and fairness associated with using models, Congress required that EPA "specify with reasonable particularity each air quality model or models to be used under specified sets of conditions for purposes of [PSD]." 42 U.S.C. § 7475(e)(3). To meet this requirement, EPA has set forth approved models in its Guideline on Air Quality Models included in 40 C.F.R. Part 51, Appendix W. Calpuff is not included in Appendix W as an approved model. In fact there is no long range transport model currently approved in EPA's Guideline on Air Quality models. See 40 C.F.R. Part 51, Appendix W. As noted above, in circumstances where there is no recommended model, EPA's own modeling guidelines expressly provide that use of monitored data is appropriate, even in the permitting context, for making increment determinations. Id. at 11.1.

North Dakota law requires that "all estimates of ambient concentrations . . . must be based on the applicable air quality models . . . specified in the Guidelines on Air Quality Models as supplemented by the North Dakota Guideline for Air Quality Modeling Analysis." NDAC 35-15-15-1.f(1). Calpuff is not an approved model under either of these guidelines. Further, under the Clean Air Act, as well as state and federal regulations, before a guideline model may be adjusted or a non-guideline model may be used, such models and adjustments must be subject to peer review, notice, public comment and hearing. As noted by EPA in Appendix W, "all changes to the guideline

must follow rulemaking requirements [and EPA] will promulgate proposed and final rules in the Federal Register to amend Appendix W [only after] ample opportunity for public comment is provided for each proposed change and public hearings." 40 C.F.R. Part 51, Appendix W at 1(g). Calpuff, and adjustments to Calpuff, have not been subject to such an approval process. Accordingly, use of Calpuff is inappropriate as the basis for any regulatory decision.

B. Preliminary Efforts To Use This Model Highlight Its Many Uncertainties And Questionable Validity And Underscore That The Model Is Not Yet Ready To Be Used For Regulatory Purposes

The problem with using Calpuff for these proceedings is perhaps best illustrated by NDDH's finding that if the IWAQM recommended settings were used, as EPA also recommends (but apparently for unspecified reasons has elected not to use here), the model would be incorrect by more than a factor of 2, and thus invalid under even EPA's generous measure of model validity. As noted by NDDH in its limited validation review, "changing all control file settings to IWAQM-recommended values, for example, would likely move predicted-to-observed ratios outside of the factor-of-two window." NDDH Evaluation of Calupuff Model Performance Using Year 2000 Data, at 60, App. Ex 5. Put another way, the model, when used as recommended, does not provide valid results.

Such a conclusion, however, should not be surprising considering that both EPA and IWAQM, who is working to develop this model, have stated that the model is only appropriate for modeling impacts at distances up to 50-200 km. See, e.g., 65 Fed. Reg. 21539 (April 21, 2000). Here, EPA is attempting to use this model to guess at ambient concentrations at distances well over 200 km. As discussed in the testimony of Robert J. Paine, IWAQM's own research indicates that Calpuff over-predicts concentrations by a factor of 3 to 4 for such longer distances. Testimony of Robert J. Paine, Transcript at 401, App. Ex. 3. Inaccurate results in this instance are also consistent with EPA's stated concerns about the ability of models to predict short-term concentrations. As noted by EPA in its modeling guidelines, "models are more reliable for estimating longer time-

averaged concentrations than for estimating short-term concentrations at specific locations." 40 C.F.R. Part 51, Appendix W at 10.1.2(a).

Significantly, EPA has not conducted, or at least provided, any validation of the Calpuff model, as modified by EPA. Reliance on NDDH's "limited" validation review by EPA does not make sense, as the validation review by NDDH was conducted using year 2000 data and the modeling was conducted using years 1990-94. Additional deficiencies in the validation review conducted by NDDH, such as the failure to perform certain standard diagnostic analyses, are discussed in detail in the testimony of Richard Londergan and the attached Earth Tech Modeling Report. See, Testimony of Richard Londergan, Transcript at 566-571, App. Ex. 3; Earth Tech Modeling Report, at 4-5, App. Ex. 2.

Review of NDDH's limited validation review by Earth Tech, the company that developed the Calpuff model, indicates that had an appropriate validation assessment been conducted, the assessment would have further indicated unacceptable model performance. For example, Earth Tech's review indicates exceptionally poor model performance when comparing seasonal patterns of observed and predicted peak concentration values. Earth Tech Modeling Report, at 4-5, App. Ex. 2 (noting that "the majority of peak observed impacts occur in the winter, while only 4 of 34 peak predictions occur in winter."). Earth Tech's review of the validation assessment also indicates that the model results in a "systematic overprediction bias for peak concentrations." Earth Tech Modeling Report, at 9, App. Ex. 2.

An excellent indicator of EPA's flawed analysis, and the problems with the way Calpuff is being used here, is that all 2nd highest high predictions of SO_2 concentrations for both 3-hour and 24-hour standards for the South Unit using either the "regulatory defaults" or "locally developed input settings" as set forth in EPA's Draft Modeling Report were higher than any actually measured highest 2nd high measurements in that area over the last ten years of available data. Earth Tech Modeling Report, at 8, App. Ex. 2. Compare EPA Dispersion Modeling Analysis of PSD Class I Increment Consumption in North Dakota and Eastern Montana (hereinafter "EPA Draft Modeling Report") at 37, App. Ex.

6, with SO_2 Monitoring Report at 9-10, App. Ex. 1. Courts considering model validity typically have held that "an agency's choice of model will be sustained only where it bears a rational relationship to the characteristics of the data to which it is applied" and that EPA must "back up" any modeling analysis with "checks against real world data." State of Ohio v. EPA, 784 F.2d 224, 230 (6th Cir. 1986) citing Northern Ohio Lung Association v. EPA, 572 F.2d 1182 (6th Cir. 1978). That has not been done here.

So far, EPA and NDDH have pointed to two different sets of results each, when the unapproved Calmet and Calpuff models are used to guess at ambient concentrations. The modeling exercise, to say the least, is complicated and relies on assumptions about hundreds of different variables to ultimately guess at anticipated concentrations. Expert upon expert can explain why certain settings should be used. In fact, every modeling expert that participated in the May 6-8 hearings provided different recommendations about which settings, adjustments and evaluations might yield the most accurate results. Compare testimony of Richard Londergan, Kevin Golden, John Notar, Kirk Winges and Robert J. Paine, Transcript at 556-83, 40-56, 137-79, 332-375 and 396-456, App. Ex. 3. Both EPA Region VIII and NDDH have themselves opted to use different settings than developed and recommended by EPA headquarters, the U.S. Forest Service, and the U.S. Fish and Wildlife Service as part of the Interagency Workgroup on Air Quality Models. See also Testimony of John Notar of the U.S. Fish and Wildlife Service, Transcript at 167-68 (describing deficiencies of EPA's modeling approach and how EPA's draft modeling deviated from EPA's own guidance), App. Ex. 3.

While all the experts may not agree on which settings ought to be used, the experts do agree that changing settings or making certain assumptions ultimately affects a model's results. Which settings, if any, are correct? It is, at best, unclear. And this, perhaps as much as anything, exemplifies why use of this unapproved model, for which only a very limited and unrepresentative validation assessment has occurred, is not appropriate to assess whether North Dakota's SIP has adequately prevented significant deterioration.

C. Modeling Conducted To Date Does Not Use The Right Measure Of Baseline Emissions

Another problem with modeling conducted to date is not just that the agencies have elected to use a non-guideline model, or that the model is likely inaccurate, but that the wrong numbers are being fed into the model. How accurate the model may or may not be is ultimately immaterial if the wrong emissions numbers are used to establish baseline emissions and baseline concentrations. Unfortunately, neither EPA nor NDDH have used the correct baseline emissions in their modeling.

Given the different interpretations put forward about what constitutes "baseline emissions," it is possible to conclude that this term may be ambiguous in the context of assessing increment consumption. Under North Dakota law, if a word or phrase is unclear it is appropriate to look to the legislative history to determine a statute's meaning. See, e.g., Production Credit Ass'n of Minot v. Lund, 389 N.W.2d 585, 586-87 (N.D. 1986); Heartview Foundation v. Glaser, 361 N.W.2d 232, 235 (N.D. 1985). Further, North Dakota law provides that where the State adopts a federal statute, it does so with the implied knowledge of the federal interpretations placed on such statute. Unemployment Compensation Division v. Bjornsrud, 261 N.W.2d 396, 398 (N.D. 1977). Accordingly, it is appropriate to look to the legislative history of the Clean Air Act to determine how baseline concentration should be evaluated.

According to the legislative history, baseline emissions should be based on allowable emissions of baseline sources:

> "Baseline pollution level" is the level of pollution calculated to exist assuming plant capacities as of January 1, 1975 . . . . The committee emphasizes that the "baseline pollution level" includes existing sources' emissions calculated on the basis of total plant capacity. For example, even if a plant has been operating at 60 percent capacity, its total capacity for emissions is included in the "baseline . . . . Furthermore, no rollback in emissions from existing plants would be required under the provisions of this section.

H.R. Rep. 95-1175, 95th Cong., 1st Sess. (emphasis added). EPA's position, as articulated by Richard Long's testimony, is completely counter to this clearly expressed intent of Congress about how baseline emissions should be established. See Testimony of Richard Long, Transcript at 115-16, App. Ex. 3. In fact, EPA's recent position is even counter to what EPA has stated about the nature of increment consumption from baseline sources. For example, in the June 19, 1978 preamble to the New Source Review regulations, EPA stated that:

> Actual emissions also includes into the baseline any future increases in hours of operation or capacity utilization as they occur if such are allowed to the source as of [the major source baseline date] and if the source could have been reasonably expected to make these increases on this date.

43 Fed. Reg. 26388, 26400 (June 19, 1978) (emphasis added). Again, this is consistent with the House Report which repeatedly makes clear that "total plant capacities" are to be included in the baseline concentration:

> The baseline pollution level includes the ambient concentrations calculated to exist, assuming total plant capacities in being on January 1, 1975. . . [and] additional plant capacities for new sources which receive new source permits prior to date of enactment . . . . Therefore, the bill's definition of baseline level authorizes the "grandfathering" of not only all existing industrial capacity, but also of new capacity under construction. . . .

H.R. Rep. 95-1175, 95th Cong., 1st Sess. (emphasis added). Given the clarity of the legislative history on this issue, and EPA's own comments, NDDH should use allowable emissions to establish baseline emissions for any modeling exercise to assess increment consumption. This interpretation is consistent with legislative intent and is expressly provided for under EPA's regulations and North Dakota law, which define "actual emissions" to mean "source-specific allowable emissions." See 40 C.F.R. § 52.21(b)(21)(iii); NDAC 33-15-15-01.1.a(2).

i. Allowable Emissions Are "Representative" Of "Normal Source Operation"

North Dakota Law, NDAC 33-15-15-01.1.a(2), also defines "actual emissions" to include those emissions that are "representative of normal source operation." When considering

the 3-hour and 24-hour maximum standards that are at issue here, the source-specific allowable emissions accurately reflect "normal source operation" of many of the baseline sources. Allowable emissions, which reflect the design and expected operation of many facilities, are "representative" of "normal operation" and should be used to determine baseline emissions. Such an approach is consistent with facts provided by Great River Energy and other utilities establishing that these facilities may have met, or in some cases exceeded, allowable emissions on a short-term basis. See EPA Draft Modeling Report at 24, App. Ex. 6 (discussing that Milton R Young Unit 2 baseline emissions were above allowable emissions). See also App. Ex. 7 that includes Sept. 7, 2001 and March 20, 2002, correspondence from Great River Energy to NDDH that supports why use of allowable emissions is appropriate for establishing baseline emissions for Stanton Station. Such an approach also is consistent with Congressional intent that increment consumption come from *new* sources or modifications that occur after the baseline date, rather than from the fluctuating emissions of existing sources.

EPA contends that baseline concentration should be calculated based on the estimated emissions from certain sources for the two-year period prior to the minor source baseline date. Use of a "two-year period" prior to the minor source baseline date for establishing baseline concentration would, for many utilities, create an artificially low baseline concentration that is not representative of "normal source operation," source operation prior to the baseline date, or source capacity at the baseline date. See also, App. Ex. 7. Actual SO_2 emissions from utilities are affected by numerous variables, including electrical demand, plant maintenance, and fuel quality. Estimated SO_2 emissions are further affected by variables such as emission factor characteristics. Selection of a "two-year period" for estimation of emissions for establishing baseline will artificially reduce baseline such that, even without any modification of a plant, the facility could be viewed as consuming increment based on nothing more than normal emissions fluctuation. See also App. Ex. 7.

Baseline emissions used in EPA's modeling analysis also are incorrect because the agency arbitrarily decided to exclude numerous minor source contributors to baseline

emissions. See EPA Draft Modeling Report at 17, n. 7, App. Ex. 6. Evidence indicates that emissions from a number of minor sources, consisting primarily of oil and gas wells located in close proximity to the Class I areas, prior to the baseline date, have since decreased significantly, thus expanding available increment. See Testimony of Terry O'Clair, Transcript at 15, App. Ex. 3; and Testimony of Ron Day, Transcript at 596-97, App. Ex. 3. EPA's decision to not include these sources as part of the baseline is arbitrary and capricious.

D. Draft Modeling Conducted To Date Fails to Appropriately Assess Increment Consumption

i. Draft Modeling Does Not Use The Appropriate Meteorological Data

Increment consumption, to the extent that it is based on modeling, should, for purposes of this type of proceeding, compare baseline allowable emissions, as I just discussed, to present day CEM data paired with current meteorological data. This provides the most realistic assessment of current emissions and the appropriate comparison to determine whether air quality has in fact degraded. Use of five years of meteorological data from the early 1990's is not the best, or even relevant, data for assessing current concentrations of SO_2. Again, this is not a prospective permitting proceeding. The purpose of this proceeding is to consider whether, in fact, SO_2 concentrations have increased in the Class I areas. The best and most relevant factual information concerning present day air quality should be used to make such an assessment. Similarly, and as discussed in the Earth Tech Modeling Report, Calpuff modeling by NDDH and EPA also should have been conducted using a more comprehensive meteorological model such as the Penn State MM5 model. Earth Tech Modeling Report at 7, App. Ex. 2. Neither NDDH nor EPA used such a model.

ii. Draft Modeling Does Not Use "Comparable" Data When Comparing Baseline and Current Emissions

Comparison of AP-42 estimated emissions with present-day CEM data in the EPA and NDDH analyses is arbitrary and yields an incorrect assessment of increment

consumption. As Great River Energy documented and provided to the Department last September, based on analysis of five years' of CEM data, AP-42 emissions estimates severely underestimate emissions compared to CEM measurements. See App. Ex. 7. During the hearing, Mr. Schwindt requested a comparison of CEM and AP-42 calculated emissions for 2000 and 2001. Transcript at 533, App. Ex. 3. Included in Great River Energy's September 7, 2001 letter to NDDH is a comparison based on year 2000 data. App. Ex. 7. App. Ex. 8 includes an analysis for 2001. Data from 2000 and 2001 further supports that AP-42 calculated emissions severely underestimate emissions compared to CEM measurements. The result of using the different methods for baseline and current emissions is that use of these different methods can make it appear that increment is consumed, where in fact actual emissions have remained constant. This results in an inherently flawed analysis. Ironically, EPA's own draft modeling report, while failing to consider this difference, makes the best case for the inequities that result by using different methods for comparing baseline and current emissions. According to EPA:

> EPA believes that any increment analysis should follow the same methodology for determining emissions in the base year as in the current year . . . Using the same methodology allows an objective comparison . . . to do otherwise does not provide "comparable" data sets. If different methodologies were used to determine emissions for the base year and the current year, comparing the two data sets would produce inappropriate conclusions since the data sets had been derived using different methodologies.

EPA Draft Modeling Report at 23 (emphasis added), App. Ex. 6. Accordingly, if NDDH decides not to consider allowable emissions as the baseline, then any modeling comparison must at least be based on either the same method (e.g., AP-42) for assessing baseline and current emissions, or should attempt to adjust emissions estimates to reflect the bias inherent to the different methodologies. See also App. Ex. 7.

iii. EPA's Modeling Approach Cannot Be Accurately Accomplished Using Calpuff

EPA also is using a "paired-in-time" approach to assess increment consumption that the Calpuff model is incapable of performing accurately. EPA's approach to assessment of increment, as discussed in the testimony of Kevin Golden and Richard Long of EPA,

relies on the Calpuff model to predict the difference between current and baseline concentrations at each receptor, event-by-event. See, e.g, Testimony of Richard Long, Transcript at 72-73, App. Ex. 3. The Calpuff model, however, when using such an event-by-event or "paired-in-time" approach is incapable of accurately predicting emissions. See Earth Tech Modeling Report at 5. See also testimony of Kirk Winges, Transcript at 356-59 (describing "horrible" and "very poor" model performance when using EPA's "paired-in-time" approach), App. Ex. 3. Thus, draft modeling conducted by EPA, which was conducted on a paired-in-time basis, cannot be used to contend an increment violation because the Calpuff model is unable to accurately predict emissions on such a basis. Any attempt by EPA to use such an approach to contend an increment violation would be arbitrary and capricious.

iv. EPA's Draft Modeling Does Not Appropriately Reflect Variances

EPA's draft modeling analysis also is flawed in that it fails to reflect the variances granted to certain sources in North Dakota. There is absolutely no basis in the Clean Air Act or its legislative history that states were to be required to "make up" increment where a permit was issued pursuant to the alternative increment standards under section 165 of the Clean Air Act. After twenty years of "silence" on this issue, EPA's recently adopted position is not only unsupported by law; it is arbitrary and capricious. See Testimony of Richard Long, Transcript at 88, App. Ex 3.

E. Draft Modeling Makes Answering A Simple Question, To Which There Is A Simple Answer, Unnecessarily Complicated

Under consideration in this hearing is whether to answer the PSD question by looking to readily available facts and air quality data provided by ambient monitors in the Class I areas, or instead employ a Rube Goldberg methodology to evaluate whether ambient concentrations of SO_2 have increased above the allowable increment. Extensive testimony was provided at the May 6-8 hearings regarding the many variables and assumptions that are involved in attempting to use Calpuff to model increment consumption. These include many different aspects of the modeling including control

file settings, source inputs, meteorological data, and deposition, chemistry and dispersion characteristics. With respect to these variables, EPA in its Appendix W discusses how, for even approved models, they result in an "inherent uncertainty" and that many "unknown and unmeasured variations" afflict modeled results. 40 C.F.R. Part 51, Appendix W at 10.1.1.

This web of variables and uncertainties is compounded even further when considering the many ways that EPA and NDDH have manipulated model settings. According to EPA's Draft Modeling Analysis, the agency has made "some adjustments," "appropriate edits," "relatively minor changes," and that the model "was modified" and "the option to extrapolate was deployed" and settings adjusted to "provide better agreement." See EPA Draft Modeling Report, App. Ex. 6. Further, correspondence, such as that from EPA's modeler to NDDH last year, that discusses "screw-ups" in the Calpuff input files and possible "glitches" in the software, lead to even greater concerns about the accuracy of modeled results. See App. Ex. 9. If even one of these many variables is not appropriately selected, is "screwed-up," or contains a "glitch," the modeled results could be significantly altered.

Given the minimal and limited efforts to validate the model, these adjustments to the model only make the accuracy of any modeled results more unclear, and further cloud the answer to the question of whether ambient concentrations of SO_2 have increased above allowable increment. A question to which there already exists a simple and clear answer based on actual monitored data.

V. Conclusion and Proposed Findings

In conclusion, draft modeling conducted to date by EPA, or even NDDH for that matter, cannot be used to contend a violation of the increment. This modeling has not been: (1) conducted using an approved model; (2) conducted using recommended or appropriate model settings and data; (3) conducted for distances for which the model is recommended; (4) thoroughly and appropriately validated; and (5) based on the

appropriate baseline emissions or the appropriate assessment of increment consumption. Accordingly, draft Calpuff data is just that, "draft."

This draft Calpuff data is not appropriate to answer the question of whether ambient concentrations of SO_2 have increased above the allowable increment. The answer to this question, however, is provided by over twenty years of ambient air measurements in the Class I areas. Actual air quality data for the Class I areas, as measured by the ambient monitors, makes clear that that SO_2 concentrations have not increased above allowable increment and that North Dakota's State Implementation Plan is adequate to prevent significant deterioration.

Accordingly, based on applicable laws, testimony and expert reports that are part of the record in this matter, Great River Energy recommends the following findings:

- All Available Air Quality Data Indicates That Ambient Concentrations Of Sulfur Dioxide In North Dakota's Class I Areas Have Not Increased Above The Increments Allowed Under The Clean Air Act.
- There Is No Valid Or Accurate Evidence To Support That There Has Been A Violation Of The Class I Increments Or That North Dakota's State Implementation Plan Has Been Substantially Inadequate To Prevent Significant Deterioration.

To the extent that NDDH conducts SO_2 modeling in the future to assess increment compliance, such as in the permitting context, such modeling should be done using an approved, appropriate and properly validated model as described above and in the attached technical reports. Further, any such modeling should be based on the appropriate measure of baseline emissions and assess increment using the approach as outlined above and prescribed by applicable law.

On Behalf of Great River Energy

By: _____ Date: May 23, 2002

James A. Mennell
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